

U.S. Fire Administration/National Fire Data Center

School Fires

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Findings

- In 2002, 37% of all school structure fires and 52% of middle and high school structure fires were incendiary or suspicious.
- Fatalities from school fires are rare, but injuries per fire were higher in school structure fires than non-residential structure fires on average.
- The leading area of fire origin was the school lavatory.
- Kindergarten through high school fires increased at the beginning and end of the academic year. School fires peaked in July 2002 due to a spike in elementary school fires.

There were an estimated 14,300 fires at non-adult schools¹ in 2002, causing \$103.6 million in property damage and 122 injuries² Of these, 6,000 (42%) were structure fires. Nearly half of school structure fires were confined to the object where the fire started, such as a small cooking fire (17%) or a fire confined to a trash can (26%).³ The majority of school fires occurred outdoors on school property and include trash fires (23%), other outdoor fires, including open fields or woods (18%), and vehicle fires (7%).

Educational institutions are governed by strict inspection and fire/life safety codes. Most schools built since the late 1970s are required to have sprinkler and other fire/smoke alarm systems. This is a likely explanation why, as shown in Figure 1, no deaths from school structure fires were reported in 2002 and such fires were less damaging than non-residential fires generally. Fires in schools were, however, more injurious than other non-residential structure fires.

FIGURE 1. LOSS MEASURES FOR SCHOOL STRUCTURE FIRES (NFIRS 2002)

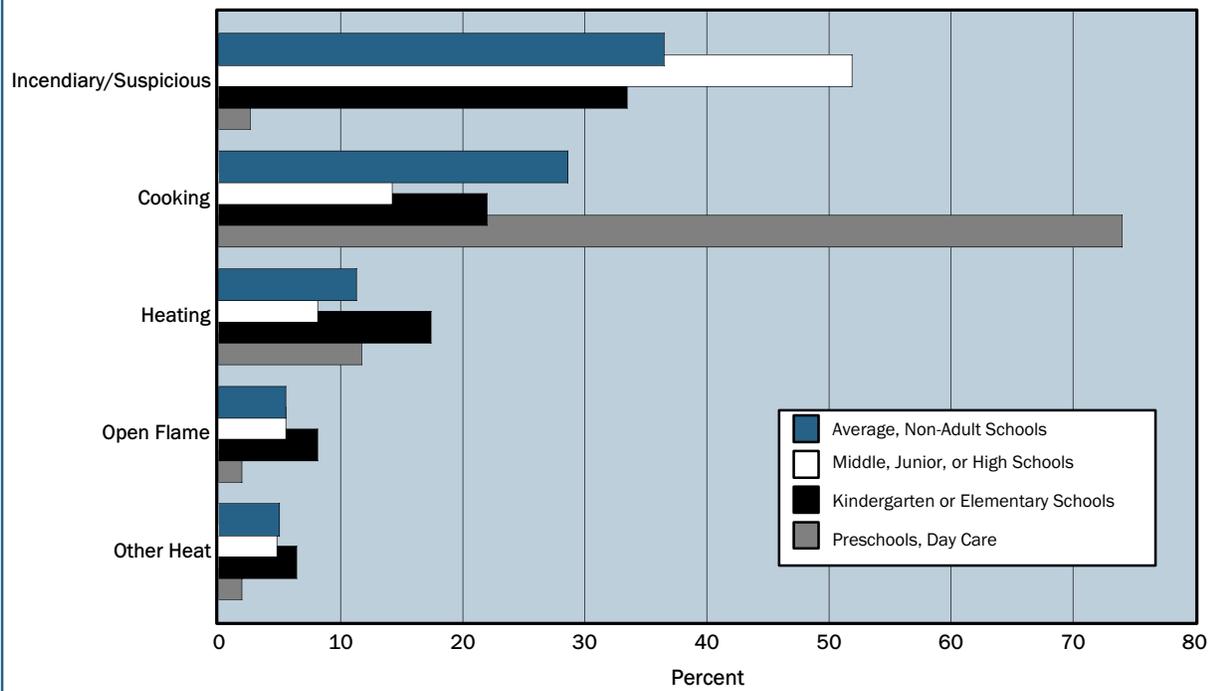
Loss Measure	All Non-Residential Structure Fires	School Structure Fires
\$ Loss/Fire	\$21,505	\$15,956
Injuries/1,000 Fires	14.4	22.0
Fatalities/1,000 Fires	1.1	0.0

Source: NFIRS 5.0 only

CAUSES

As shown in Figure 2, the leading cause of school structure fires on average is incendiary/suspicious activity, which includes arson fires, and accounts for 37% of all school structure fires and 52% of middle and high school structure fires. Cooking is the second leading cause of school structure fires on average, followed by heating, open flame, and other heat. Structure fires in preschools and day care centers are predominantly caused by cooking (74%) and heating (12%).

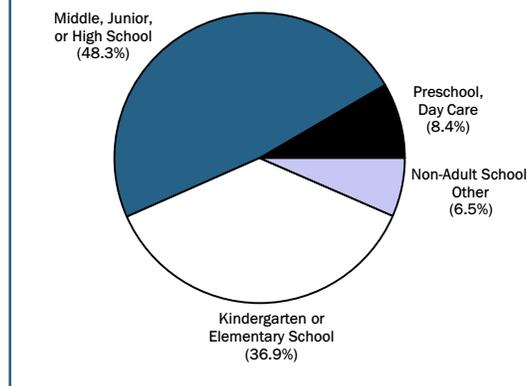
FIGURE 2. CAUSES OF SCHOOL STRUCTURE FIRES (NFIRS 2002)



Source: NFIRS 5.0 only

Children may be the ones involved in setting arson fires in schools; unfortunately this cannot be determined from NFIRS data alone. As shown in Figure 3, the greatest percentage of fires occur in middle and high schools, followed by elementary schools. This distribution does not imply an associated age for a juvenile involved in the firesetting, but does suggest the potential for middle- and high school-age involvement.

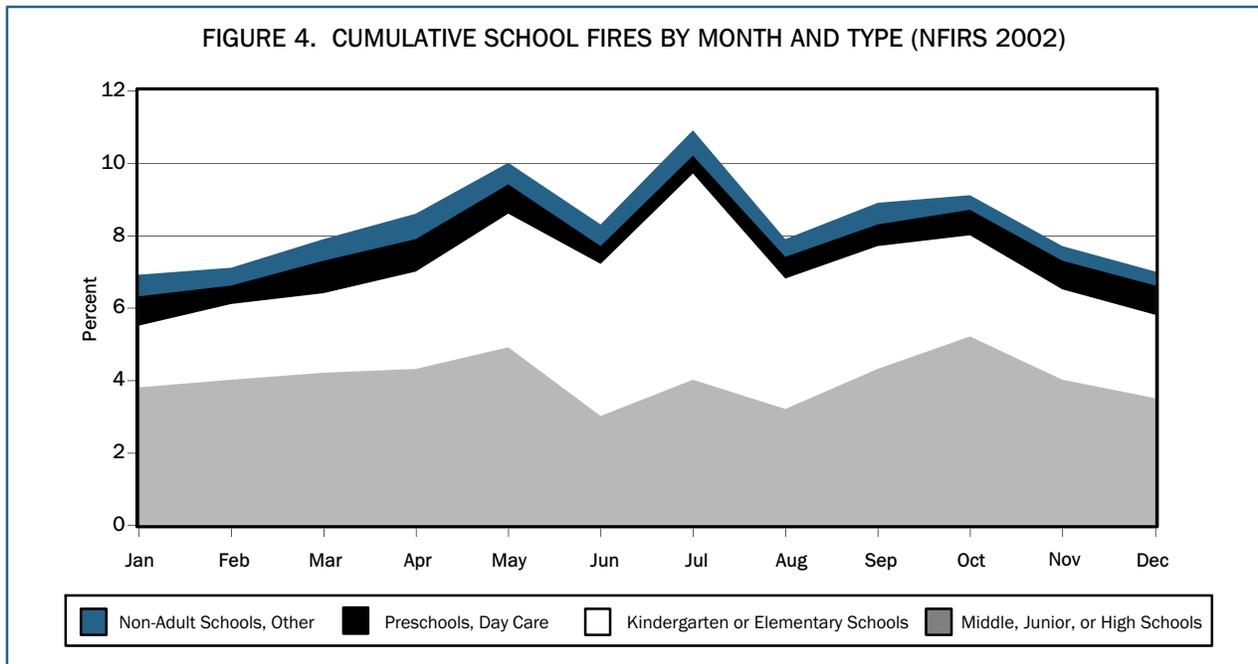
FIGURE 3. ALL SCHOOL FIRES BY SCHOOL TYPE (NFIRS 2002)



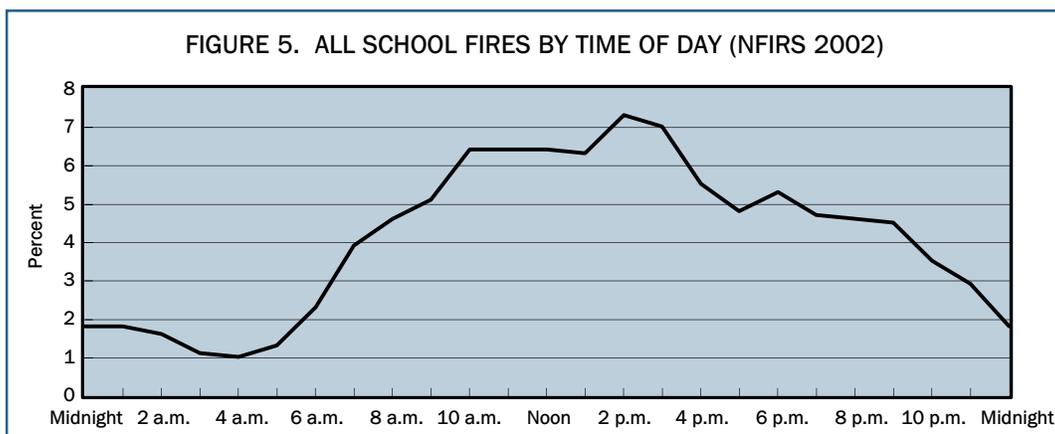
Source: NFIRS 5.0 only

WHEN FIRES START

Figure 4 illustrates the cumulative incidence of all school fires by month and school type. The peak month for school fires in 2002 was July, driven by a sharp increase in fires at elementary schools. It may be that elementary schools were more attractive targets for incendiary or suspicious fires during the summer when few school staff are on site. Elementary, middle, and high schools had above average fire incidence in the spring and fall—typically the end and beginning of the academic year. Fire incidence was at its lowest between November and February, in the middle of the academic year. Fires at preschools and day care centers moderately increased during the academic year.



Seventy-eight percent of school fires occur during the school week and 22% on weekends. Fifty-five percent of fires occur between 8 a.m. and 5 p.m., the hours students are most likely to be in school (Figure 5). Thirty percent of fires occur between 5 p.m. and midnight; 15% occur between midnight and 8 a.m. This pattern is consistent for all of the major cause categories.



WHERE FIRES START

Figure 6 shows that bathrooms are where the highest percentage of school fires originate, typically in bathroom trash cans, which contributes to the predominance of incendiary or suspicious fires. Older students smoking in bathrooms may also increase the risk of such fires. These areas present children with a place to set a fire without having to contend with constant adult supervision. Kitchens are the second leading area of origin for structure fires, reflecting cooking fires, and outdoor areas are the second leading area of origin for all school fires, which include fires set in outdoor dumpsters and fields.

**FIGURE 6. LEADING AREAS OF ORIGIN OF SCHOOL FIRES
(NFIRS 2002)**

Structure Fires		All School Fires	
Bathroom	23%	Bathroom	12%
Kitchen	9%	Outside Area, Other	12%
Assembly Area < 100 Persons	6%	Open Area, Field	8%

Source: NFIRS 5.0 only

MATERIAL IGNITED

The most common materials ignited in school structure fires are paper, plastic, wood, and fabric. These materials reflect the high incidence of both incendiary and trash fires, are consistent with the materials commonly used by juvenile firesetters, and are common materials in and around schools.

EXAMPLES

In the fall of 2004, the city of Baltimore, MD, experienced an increase in school fires, typically in a “trash can, a locker, a bathroom, or a stairwell,” which increased the frequency of school evacuations. The increase in incendiary fires was attributed to a high student/teacher ratio and lack of supervision.⁴

In October, 2002, vandals broke into a middle school classroom in Abilene, TX, on a Sunday morning and set a fire to “a teacher’s desk, on some textbooks and in a wastebasket.” Indications were that the vandals also attempted to break into a second classroom.⁵

In April, 2002, Howell High School in Howell, MI, was closed temporarily due to five incendiary fires that were set throughout the building in the early morning hours on the last day of spring break. A door had been forced open and a flammable liquid had been poured on books, carpets, and inside classrooms. Water from the building’s automatic sprinkler system caused additional damage.⁶

CONCLUSION

Like most fires, those in schools are largely preventable through increased supervision, outreach, and technological innovation. For further information, particularly on juvenile firesetter intervention programs, contact your local fire department or the U.S. Fire Administration.

To request additional information or comment on this report, visit
<http://www.usfa.fema.gov/feedback>

Notes:

- ¹ For purposes of this report, “non-adult school fires” include all fires occurring on property used for non-adult education, from day care through high school.
- ² School loss estimates are based on 2002 data from the National Fire Incident Reporting System (NFIRS) and NFPA’s *Fire Loss in the United States During 2002*. At the time of this report, NFIRS is continuing to transition from version 4.1 to 5.0. Due to issues related to accurate conversion of version 4.1 data to version 5.0, this report is based on version 5.0 data only.
- ³ Distribution statistics and per-fire losses are based on 2002 NFIRS data.
- ⁴ “Baltimore School Fires Spike,” *The Washington Times*, November 12, 2004.
- ⁵ “Middle School Fire an Arson,” KTXS News, October 31, 2002.
- ⁶ “Arson Fire Closes Howell School,” *The Detroit News*, April 9, 2002.